Docket No.: M4065.0706/P706
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Jiutao Li et al.

Application No.: 10/712,106

Confirmation No.: 8216

Filed: November 14, 2003

Art Unit: 1753

For: SILVER SELENIDE SPUTTERED FILMS AND METHOD AND APPARATUS FOR CONTROLLING DEFECT FORMATION IN SILVER SELENIDE SPUTTERED FILMS

Examiner: R. G. McDonald

REASONS SUPPORTING PRE-APPEAL BRIEF REQUEST FOR REVIEW

MS AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir:

On December 9, 2010, applicants received a Final Office Action rejecting claims 1-84 and 87-91. In the Final Office Action, all claims are rejected under 35 U.S.C. §103(a). Each of the rejections under 35 U.S.C. §103(a) is based on U.S. Patent No. 4,818,357 to Case et al. ("Case") in combination with U.S. Patent No. 5,534,711 to Ovshinsky et al. ("Ovshinsky"). In addition, all claims are provisionally rejected on the ground of nonstatutory obviousness-type double patenting based on the same combination of Case and Ovshinsky.

Applicants believe that the reasoning related to the obviousness of the combination of Case and Ovshinsky is in error. For clarity and brevity, Applicants will address this error primarily in the context of the 35 U.S.C. §103(a) rejection of independent claim 1. Applicants reserve the right to address other errors and other claims in any subsequent Appeal Brief.

The Final Office Action fails to establish a *prima facie* case against the patentability of the claims of the above-identified application. The Final Office Action does not sufficiently show that the cited references teach or suggest all limitations of the present claims or that the selected

elements of the references are combinable to achieve the methods of the present claims as stated in the Office Action. Applicants respectfully request that the rejections be withdrawn and the pending claims be allowed over the cited prior art.

All claims of the application relate to forming silver selenide. Claim 1 recites: "maintaining [the] silver selenide target at a temperature of less than about 350° C during [the] sputtering process to form a silver selenide film which comprises both alpha silver selenide and beta silver selenide." As explained in the specification at ¶0048:

> Silver selenide (e.g. Ag_2Se) is well known for its low temperature phase transition point of 406 K (about 130° C.). <u>At temperatures below 406 K, Ag_2Se forms an orthorhombic structure, known as the "beta phase."</u> At temperatures above 406 K (about 133° C), Ag_2Se undergoes a structural change in which the Se forms a body-centered cubic sublattice, while the Ag undergoes a melting transition. In this so-called "alpha phase" or "superionic phase," the Ag ions exhibit liquid-like diffusion.

Ovshinsky is cited for teaching the formation of a memory device including a memory material. Ovshinsky notes that the memory material can be sputtered in a process where the substrate is at a temperature ranging from ambient temperature to 300° C. Ovshinsky at Table 2. The Office Action concludes, therefore, that Ovshinsky suggests that silver selenide is formed in both the alpha and beta phases. Office Action at 38.

This, however, is not correct. Ovshinsky is silent about forming silver selenide. It is well known by those skilled in the art that silver selenide is a degenerate compound semiconductor material and does not function as a memory material that would be suitable for Ovshinsky's phase change type memory devices. In addition, Ovshinsky does teach use of any particular target temperature. Thus, Ovshinsky's methods do not relate to, nor does Ovshinsky teach or suggest, forming silver selenide, much less that silver selenide is formed in both the alpha and beta phases.

The Office Action then relies on Case for teaching a target temperature to supplement Ovshinsky's teachings and suggestions. Office Action at page 4. Case, however, relates to a method for sputter deposition to form homojunctions, particularly photovoltaically active semiconductor homojunctions. Case at col. 2, lines 52-68. Case is not concerned with forming

memory devices as Ovshinsky is and, like Ovshinsky, Case is silent about forming silver selenide, much less forming silver selenide in both the alpha and beta phases. Thus, even when considered in combination, Ovshinsky and Case fail to teach or suggest the features of any of the present claims.

Moreover, the Office Action has selected a single process parameter from Case's method for combination with Ovshinsky. Specifically, the Office Action cites Case for disclosing "the target [being] kept at 50 degrees Centigrade." The Office Action ignores that Case further discloses heating the "substrate…to 450 degrees Centigrade plus or minus 20 degrees Centigrade … to provide enough thermal activity to the deposited atoms to ensure proper interatomic bonding." Case at col. 9, lines 38-45. At this temperature it will be impossible for the silver selenide to form in the beta phase – it will instantly transition to the alpha phase upon contact with the substrate, which is heated far above the transition temperature. Thus, Case, taken as a whole, teaches away from the method of claim 1.

The Office Action states that one skilled in the art would be motivated to select the single process parameter of Case (the target being kept at 50 degrees Centigrade) to modify Ovshinsky's process for the purpose of preventing evaporation and sublimation of the non-metallic atoms of the target. Office Action at 11 (citing Case at col. 9, lines 38-41). Evaporation and sublimation are not concerns in the deposition of silver selenide. Therefore, one skilled in the art would not be motivated to modify Ovshinsky based on the teachings of Case.

The present claims would not have been obvious in view of the cited reference and there are no reasons why one skilled in the art would combine Case and Ovshinsky in the manner set forth in the Final Office Action. Instead, the Final Office Action is improperly based on hindsight and uses the present specification as a roadmap for piecing together various general teachings of the cited references. See *Akzo N.V. v. U.S. Int'l Trade Comm'n*, 1 USPQ2d 1241, 1248 (Fed.Cir. 1986) (stating that one "cannot pick and choose among individual parts of assorted prior art references 'as a mosaic to recreate a facsimile of the claimed invention,'" citing *W.L. Gore & Assocs, Inc. v. Garlock*, 721 F.2d 1540, 1550, (Fed.Cir. 1983), *cert. denied*, 469 U.S. 851 (1984)).

The Final Office Action does not sufficiently show that the cited references teach or suggest all limitations of the present claims or that the selected elements of the references are

combinable to achieve the methods of the present claims as stated in the Office Action. Thus, the Final Office Action fails to establish a *prima facie* case against the patentability of the claims of the above-identified application. Applicants respectfully request that the rejections be withdrawn and the pending claims be allowed over the cited prior art.

With respect to the rejection of claims 78, 79, 82 and 83, more specifically, the Office Action further relies on Case's teaching of heating the "substrate…to 450 degrees Centigrade plus or minus 20 degrees Centigrade." Case at col. 7, lines 44-56; Office Action at 35. As discussed above, at this temperature it is impossible for the silver selenide to form in the beta phase – it will instantly transition to the alpha phase upon contact with the substrate, which is heated far above the transition temperature. Each of claims 78, 79, 82 and 83 requires that silver selenide be formed in both the alpha and beta phases. Thus, the Office Action's proposed combination would not result in the method recited by any of claims 78, 79, 82 and 83. For at least this additional reason, Applicants respectfully submit that the rejection of claims 78, 79, 82 and 83 over Ovshinsky and Case should be withdrawn.

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Respectfully submitted,

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